AUDECIBEL

January / February 1954
Vol. III No. 1

This issue contains scientific papers by:

- Richard J. Bellucci, M. D.
- Pierce W. Theobald, M. D.
- Samuel Rosen, M. D.
- Aram Glorig, M.D.

JOURNAL OF THE SOCIETY OF HEARING AID AUDIOLOGISTS

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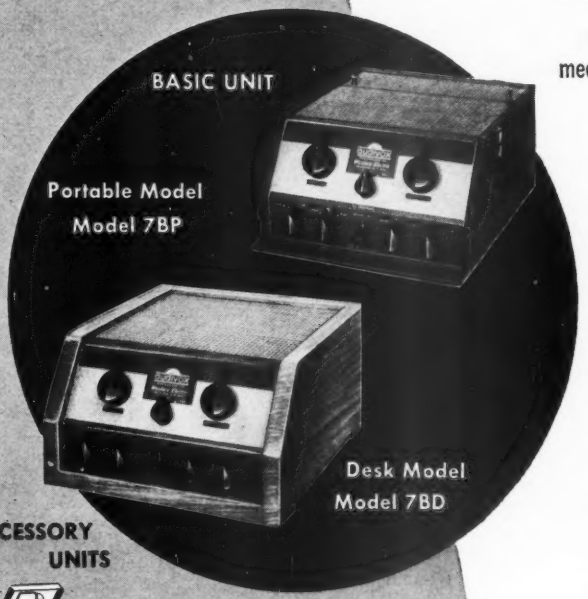

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The Purpose. Audecibel is strictly an educational and professional journal, the purpose of which is to bring to the otologist, the hearing aid audiologist and others interested in the field of hearing and audiology, authoritative articles, papers and data concerned with research, techniques, education and new developments in the field of treating and assisting the hard of hearing.

The Goal. The *Society of Hearing Aid Audiologists* is dedicated to the goal of reaching and maintaining the highest possible ethical standards in the field of hearing aid audiology. • *Audecibel* is dedicated to the goal of rapport among all those concerned with the hard of hearing so that mutual and overlapping problems may be recognized, and outstanding ideas, skills and experiences be shared for the greater benefit of all. You are urged to write in for details of how YOU may participate in and benefit by this worthwhile endeavor.

AUDECIBEL

Official Publication of the

Society of Hearing Aid Audiologists

Thornton Zanolli, *Editor* — Edgar Miller, *Art Editor*
Grover C. Coil, *Managing Editor*
C. Katzmann, *Circulation* — D. Seals, *Production*

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AUDECIBEL is published bi-monthly by the Society of Hearing Aid Audiologists, Suite 1209, 6 North Michigan Avenue, Chicago 2, Illinois. Phone: STate 2-6859. Address all communications to this office, attention Grover C. Coil, managing editor. Subscription rates $3.00 per year; $4.00 outside continental United States. *Papers are solicited* from SHAA members, physicians and others interested in the field of audiology. All manuscripts submitted must be signed by the author. Photographs, charts or diagrams accompanying such manuscripts become the property of this publication. *Change of address* will be effected one month after its receipt by this office. Give both old and new addresses.

Now is the Time to ACT!

. . . a Message from *Grover C. Coil*

The American Hearing Aid Association (association of hearing aid manufacturers) met at the Lexington Hotel in New York City on February 9th. The major purpose of this meeting was to further organize the great publicity and public relations activities upon which they recently engaged, of which we whole-heartedly approve and extend our complete cooperation, taking exception to only one item on their agenda which reads as follows: *"Consideration of an industry program of certification of hearing aid consultants in view of individual certification programs by individual companies and dealer organizations."*

We hope that this indicates neither desire nor intent to "TAKE OVER" the certification plan of the Society of Hearing Aid Audiologists, which is an organization of, by and for the retailers. If this does indicate an intention or desire on the part of the manufacturers to set up another certification plan, we, after a great deal of deliberation and consultation, fail to find in it anything hopeful for the best interest of the hearing aid retailers as a whole and certainly not for the members of our Society.

We have had an experience with the Manufacturers' Association taking over another organization created and sponsored by the dealer group. Certainly that experience will not be quickly forgotten.

As we see it, the problem of industry-wide public relations expressed in the fewest possible words amounts to this—it is the problem of the manufacturers to get more people to buy more hearing aids. It is the problem of the retailers to get these people to buy these hearing aids through orthodox hearing aid dealers and not through agencies of the state, national, state or municipal; not through clinics and over-the-counter stores.

The dealer organization, the Society of Hearing Aid Audiologists, expects to pursue just such a public relations policy and it desires and invites the cooperation of manufacturers individually and of the American Hearing Aid Association to the end of assisting to make this program at the retail level have the greatest maximum effectiveness.

We would like, here and now, to make a firm statement that, in our opinion, there is not a member of the Society of Hearing Aid Audiologists, dealer or consultant, who could not today afford to spend $100.00 in advertising his or her business. Therefore, we propose now that each member subscribe $100.00 to an advertising and publicity fund for the purpose of advertising and publicizing the Society of Hearing Aid Audiologists, enumerating specifically the reasons why a person interested in or about to purchase a hearing aid should, before so doing, visit and consult with one of our members; and that the individual members, consultants and dealers, be publicized by name and address and in media circulated in their own individual localities.

For the $100.00 that you pay into this advertising fund, we can almost assure you that you will receive during the coming year in your own localities many times the advertising and publicity that you could purchase for the money.

In addition, you will benefit by 'paid for advertising' in national publications such as "Saturday Evening Post," "Newsweek," medical journals and other national media.

We repeat—all of this money will be used for the purpose of ***advertising and publicizing the Society, its activities and its members,*** and not for other purposes. Direction of this fund will be by an advertising and public relations firm of national standing whose selection will be approved by the Board of Governors of the Society of Hearing Aid Audiologists.

Now is the time for us to act with an aggressive campaign paralleling that of the manufacturers. We would appreciate hearing from all of those who feel that this would be the best $100.00 that they ever spent in advertising.

We want to hear from every member of the Society **right now** ***—with a check in full; with a check in part and a letter pledging the balance at a given date; or with a pledge, indicating when it will be fulfilled*** . . . made out to ADVERTISING FUND, SHAA. All checks and pledges will be acknowledged upon receipt and published in AUDECIBEL.

No action will be taken in spending these advertising funds until the amount totals a sum considered by the Board as adequate to launch this campaign.

Eastern Regional SHAA Meeting

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7,000 plus to Physicians, E.E.N.T. specialists

5,000 plus to Hearing Aid Retailers and Manufacturers

2,000 plus to individual Teachers, Clinicians and others working with the hard of hearing

1,000 plus to Schools, Hospitals, Veterans Administration Facilities, Audiology Clinics, Rehabilitation agencies, Social Service agencies and miscellaneous others.

Yes!—the more than 15,000 people who receive this issue of AUDECIBEL will NOT see your message which might have appeared here.

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AUDECIBEL is the BEST buy in the hearing aid field. There is no waste circulation—99% of our readers and their families are of the "upper-half" group of American families which buys more than 70% of all goods sold. This is YOUR MARKET no matter what you sell.

AUDECIBEL

Official Publication of the Society of Hearing Aid Audiologists

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Hearing Conservation in Children

by Richard J. Bellucci, M.D.

Surgeon in Charge, Hearing and Speech Clinic
Manhattan Eye and Ear Hospital, New York, N.Y.

Dr. Richard J. Bellucci addresses an intensely interested group at the New York SHAA meeting on his specialization, the subject of hearing conservation in children.

I indeed welcome this opportunity to speak before a group of audiologists, technicians and hearing aid dealers on a subject which will help present the medical point of view with regard to the prevention of deafness in children. I believe strongly that we who are dealing with hard of hearing children should thoroughly understand what medical and surgical services are available and conversely, the medical profession should be acquainted with the magnificent advances in the field of electronics which have greatly improved the outlook for the hard of hearing child.

The conservation of hearing in children begins before the child makes his appearance on earth. Public Health regulations must exist and be enforced in order to keep the mother free of contagious diseases which may in turn develop toxins that cause injury to the embryo in its early development. Competent prenatal care with regard to the mother's general health and the early detection of toxemias are recognized as important preventive measures. It is necessary, therefore, that any condition causing fetal distress should be detected early and corrected. Laboratory tests for syphilis and RH factors are to be done routinely.

At the delivery precaution should be taken to prevent disturbance of circulation to the fetus. The circulation carries the oxygen supply and should this supply become impaired, the delicate brain tissue suffers and permanent damage to the brain may result. It is well to know that the brain is the first tissue to feel the effects of lack of oxygen and severe damage may result when oxygen is lacking for only seven to ten minutes. A turn or two of the umbilical cord around the baby's neck or compression of the cord against the mother during the delivery are common occurrences in obstetrics and are sufficient to impair circulation. Deep and prolonged sedation as well as a long and vigorous delivery with prolonged compression of the baby's head leads to anoxia and may cause injury to the brain. However, the baby may not die from this insult but this type of injury forms the basis of one theory of how aphrasia can occur. Although aphrasics do not seem to hear their cochleae are intact but their brain is damaged so badly it is difficult for them to learn and therefore hearing and speech are retarded.

Malformations

The most serious condition involving the external auditory canal is congenital malformation or microtia with atresia of the external auditory canal. This causes a marked loss of hearing of the conductive type when the condition is bilateral. Although the patient may hear by bone conduction and the inner ear may be fully developed there is usually a 60-70 db hearing loss which is sufficient to prevent the child from acquiring good speech and preclude attendance at school with a delay in his education.

Surgical correction of the defect is possible and a new external canal can be formed. However, as there is usually a total obliteration of the canal with absence of eardrum and rudimentary ossicles, there is little hope of a simple operation. Also, many other malformations can be encountered which complicate the surgery and the procedure is undertaken only by surgeons with considerable experience. A unilateral undeveloped ear canal in my opinion does not need correction. The patient with one good ear has adequate hearing and need not be exposed to this complicated and delicate surgery. However, the external ear, if deformed, may be corrected by plastic procedures.

Where Problems Begin

To ignore the nose and throat in the presence of ear disease is a grave error for most ear problems have their beginning in the respiratory passages. Many times the cure of ear disease rests principally in treatment of the nose and throat. Ear infection usually begins with an upper respiratory infection which enters the eustachion tube and causes a middle ear abscess. When the infection is severe and very acute it should be effectively treated early. Otolaryngologists are seeing fewer and fewer of these patients with acute ear infections. Usually the pediatrician or general practitioner is called to see the patient first and since the advent of antibiotics, they have developed a sense of security that all will be well. There is too strong a resistance to opening the eardrum and evacuating the infected exudate even when indications are definite. The fault lies perhaps with the otolaryngologists who have not sufficiently emphasized the dangers of unresolved exudates as the cause of hearing impairment. The patient does not very often today develop a surgical mastoiditis but frequently develops an unresolved exudate which can cause loss of hearing. The antibiotics are indeed helpful in controlling infection but the delayed resolution of exudates and the antipathy to myringotomy by parents and physicians may lead to a painless condition, the only

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Newsletter

This feature of AUDECIBEL is designed to keep you informed on current significant developments in the hearing aid industry and on significant happenings to individuals. Address contributions to *The Editor*, Suite 1209, 6 North Michigan Avenue, Chicago 2, Illinois.

George Absalom Elected

George M. Absalom, Jr., v.p. of SHAA and president of Audiphone Co. of Miami, Inc., was recently elected president of the Audiphone Dealers Association for 1954. ADA, now in its 12th year as a national organization, also elected Erling H. Hagen, E. Orange, N J., v.p.; A. A. Touch, Springfield, Ill., secy.-treas.; and John Perlee, Willis Kreuger, Ross Irwin and D. J. Marcucci, directors.

Receiver Lights

An electronic 'Babi Sitter' has been put on the market, announces Semco Electronics Corp. of New York, in which a light flashes in the receiver when the slightest sound is picked up from distances of as much as 300 feet, rendering it a valuable aid to the hard of hearing, alerting them to baby's cries, telephone or door bell rings.

FTC News

The Federal Trade Commission has remanded the hearing on its case against **Maico Co.** of Minneapolis, concerning exclusive dealership requirements, until a more completely detailed case record can be developed.

Dahlberg Co.'s (Minneapolis) advertising of its "Tru-Sonic Canal Earphone" has been attacked by the commission in a recent complaint, claiming that the advertising fails to reveal certain definite hazards in the use of the appliance.

Audivox, Inc., of Boston has agreed to abide by an FTC stipulation that the company stop representing as "confidential" its sales literature or other data available to the general public.

It is an unfair practice to use the word "Free" in advertisements or other offers to the public, as descriptive of an article or **service.** This is one of the valuable facts contained in the booklet **"Trade Practice Rules for the Hearing Aid Industry",** available from Audecibel. Enclose 10c with each order.

Beltone Hearing Institute Gives Research Grant

Sam Posen, chairman of the Beltone Institute for Hearing Research, Chicago and a major force in the creation of the newly formed Institute, has announced the grant of $1000 to Northwestern University for electronic research equipment to be used in current studies to improve techniques of clinical testing of hearing loss. This was the first step in the Institute's program, dedicated to developing and financing original research by leading universities and hearing centers. Posen is founder and president of Beltone Hearing Aid Company, Chicago.

Audivox Presented

The Junior Women's Club of Waltham, Mass. gave concrete evidence of their great interest in speech and hearing problems of handicapped children when they recently presented an Audivox audiometer to the Waltham public schools for testing purposes. Shown here at the installation of this welcome aid are (left to right) Beatrice Koulopoulos, club president; Mrs. Honora Foster, teacher, Miss Constance Fuller and Waltham Supt. of Schools John W. McDevitt.

Telex Consultants Meet

The new Telex All-Transistor Hearing Aid was recently introduced by Maurice W. Shoup, Chicago Telex distributor, at a formal dinner attended by 22 consultants and their wives. In attendance with the group were John R. Hessey, Telex vice-president, Carroll A. Carlson, Telex Sales Promotion Manager and Howard A. Cullen, Telex Sales Manager.

Medical and Surgical *Treatment of Deafness*

by *Pierce W. Theobald, M. D.*

Dr. Theobald, an alumnus of Brown University, received his M.D. from Northwestern University, interned at St. Luke's Hospital, Chicago and has since taken specialty training in ear, nose and throat at the University of Illinois. A discussion of the medical and surgical treatment of deafness can hardly be undertaken without a brief review of the anatomy and function of the ear. Therefore, in the following paragraphs, Dr. Theobald presents a condensed basic outline of the structure and physiology of the ear in health and disease.

The three parts of the ear are definitely and closely associated with each other. The external ear and the ear canal; the middle ear with the drum and ossicles and the Eustachian tube, which opens to the naso-pharynx, the cavity in back of the nose; and the internal ear, composed of the cochlea, the organ of hearing, with semi-circular canals, the structure of which has to do with balance.

Sound waves going through the auditory canal, striking the tympanic membrane, set up vibrations in the ossicular chain, the three little bones in the middle ear. The third of these bones, the so-called stapes, or stirrup, fits into a window that opens into the internal ear and is known as the oval window. There is another window, called the round window, covered by membrane, between the middle ear and the internal ear. Vibrations go through the ossicular chain and cause motion of the oval window, which transmits the vibrations to the fluid contained in the internal ear.

Anything that may go wrong in any of these structures and stop vibration will cause a hearing loss. In the external ear and the external canal, conditions affecting hearing are usually caused by foreign bodies. Children frequently place small stones or beads in their ears. A collection of wax in the ear will also obstruct the passage of sound waves to the drum. Infections of the external ear canal, particularly of the skin of the ear canal, will cause swelling, affecting hearing.

With the middle ear, probably the most common cause of hearing loss is infection. Infections may get to the middle ear by way of the Eustachian tube, having commonly started with a cold or other upper respiratory infection. Such infections are usually characterized by earaches and eventually cause discharge from the ears. In the case of chronic ear infection there is always discharge, which may be from both ears but usually is unilateral or in just one ear.

The Eustachian tube is almost horizontal in the infant and child, whereas it takes on much greater angulation in the adult. Therefore, middle-ear infection is more common in children than in adults, because it is so easy for infected material to gravitate through the tube to the middle ear. Such infections in infants do not necessarily result from a cold. The child may gag when nursing and get a little milk back of the soft palate and that material is forced through the Eustachian tube into the middle ear.

Fluid in Middle Ear

Another common cause of hearing loss is fluid in the middle ear. An accumulation of sterile serum may occur from blockage of the Eustachian tube caused by swelling, whether due to infection, or tumor, or disease of the nasopharnyx. This condition frequently results from flying with rapid descent from high altitudes; the Eustachian tube is not able to open rapidly enough to equalize the pressure in the middle ear with the higher atmospheric pressure of ground level. Swelling results and fluid accumulates in the middle ear.

Such a condition may be erroneously diagnosed as nerve-type of deafness. A correct diagnosis, however, will result in the ears being opened so the fluid is released, and a return to normal hearing.

Tumor of the middle ear is another malady that may cause loss of hearing but it is quite rare.

One of the most important diseases of the middle ear is otosclerosis. In this disease a growth of new bone forms and encroaches on the foot plate of the stirrup where it fits into the oval window, thus preventing the window from pulsating or transmitting impulses to the inner ear.

Examination of the ear of a patient who has otosclerosis usually reveals nothing. A common saying in connection with this disease is: "The patient hears nothing and the doctor sees nothing." Diagnosis must be made entirely upon history and tests of the hearing, including audiometric tests.

Deafness of the Young

Otosclerosis as a disease is a deafness of young people. It usually begins in the late teens or early 20's. It is almost always bilateral, affecting both ears, although in some cases it is unilateral. In those individuals we may be pretty certain that the opposite ear will be affected sooner or later. In cases of otosclerosis, unlike in cases of middle ear infection, there is no discharge.

Hearing loss in the external and the middle ear, as described briefly above, are called conductive hearing loss. In other words, sound is not conducted to the internal ear, the organ of hearing. The internal ear may be perfectly normal, but some condition is causing the stopping of the conduction of sound to it.

When something goes wrong in the internal ear, it is termed a perceptive deafness. Sound is conducted through a chain: through the external auditory canal, through the middle ear and its ossicular chain, and reaches the internal ear. Loss of hearing in the internal ear indicates something is wrong either in the cochlea or in the auditory nerve, thus preventing sound impulses from getting to the brain.

One type of disease of the internal ear is meniere's disease, which not only affects hearing but causes dizziness as well. It is an increase in the pressure of the fluid in the internal ear that

(Continued on Page 18)

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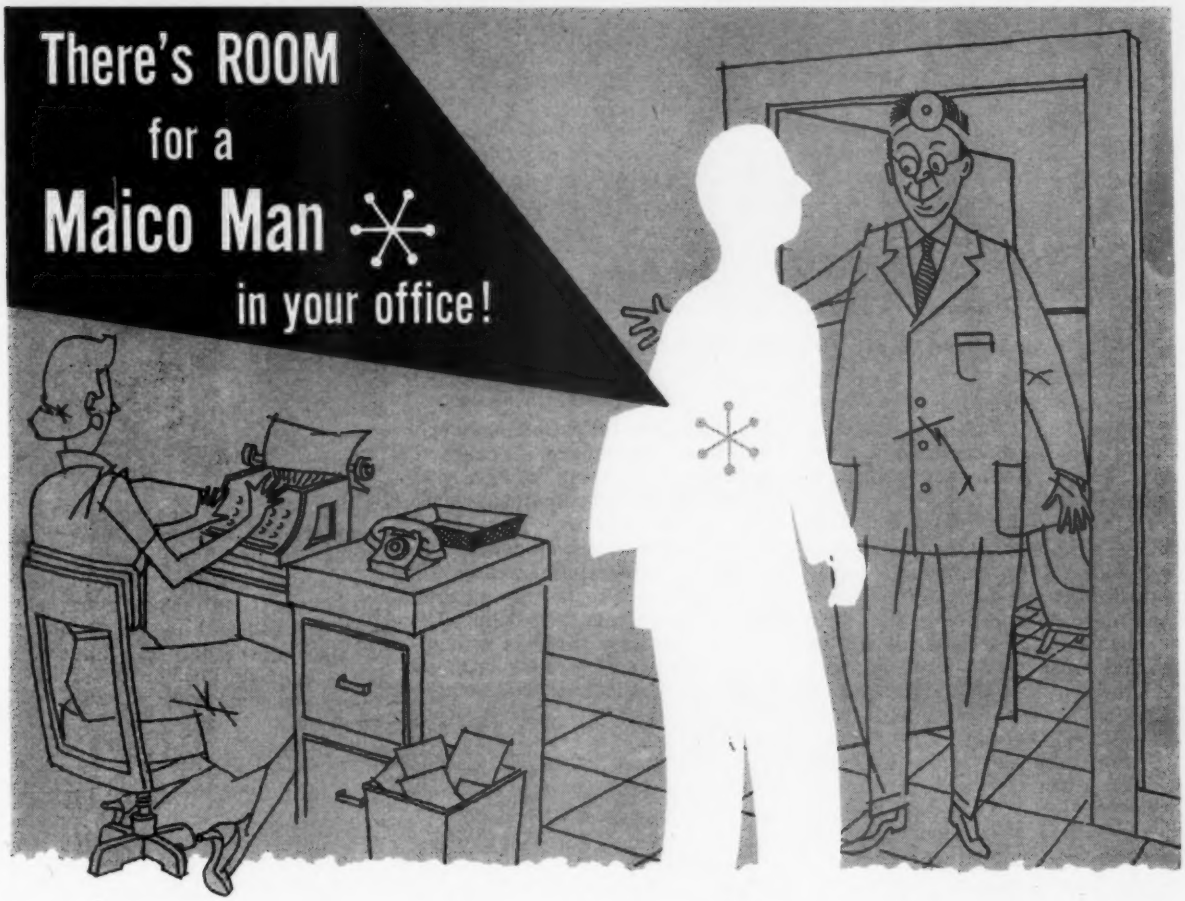

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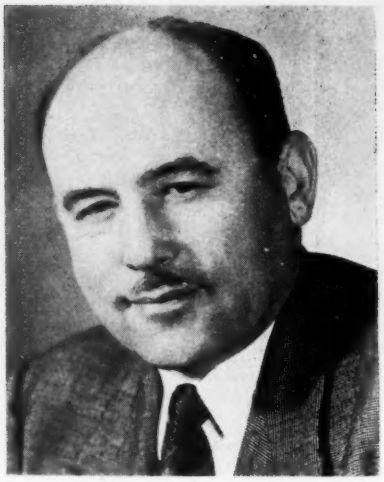
Why Wear A Hearing Aid?

by *Aram Glorig, M.D.*

Director, Audiology & Speech Clinic

Walter Reed Army Hospital, Washington, D. C.



Ladies and gentlemen, there is a very simple answer to this question. It is, "Because you have a hearing loss."

Unfortunately, however, it is not as simple as this. Many recognized and unrecognized parameters must be dealt with before such an answer is justifiable. Let us consider these parameters in the following way—those against and those for wearing the aid.

Probably the most potent reason for not wearing a hearing aid is the fact that most patients fail to recognize impaired hearing in themselves. Unlike defective vision, where distortion in visual outline is never said to be a fault in the object but is always recognized as a defect in vision, most individuals with a beginning, or borderline, or sometimes even a severe hearing loss will invariably contend that the sound source is inadequate. How many of you have heard a person with a hearing loss say, "Speak up, why do you mumble under your breath so nobody can hear you?" This attitude is typical of a hearing loss case.

Two Important Reasons

There are probably two important reasons for such an attitude. Loss of hearing is gradual in most cases and therefore unrecognized, particularly when colored by unwillingness to admit to a loss of hearing, which is the second reason for the unfavorable attitude of most individuals with defective hearing. But why is such an individual unwilling to admit even to himself that he has impaired hearing?

The answer to this question is not entirely clear, but I feel certain the history of defective hearing has developed a legendary stigma because of past attitudes toward defective hearing. For example, until a relatively short time ago mental deficiency was thought to accompany all cases of deafness. The deaf person was not allowed to vote or hold a position which carried any legal responsibility. He was denied the benefit of education because he was considered to be uneducable. With a background of this sort, is it any wonder there is a deep-seated subconscious and conscious effort to hide impaired hearing?

Let us consider these two unfavorable reasons for a moment. Recognition of impaired hearing is of course best accomplished by having a hearing test. This is not always practical, and many times at first there is no indication for testing one's hearing. I believe that everyone, both child and adult, should have at least one properly done hearing test as a routine measure. This procedure will serve two purposes: one, establish a normal baseline audiogram which serves as a reference point for future comparisons; two, indicate a hearing loss which may be amenable to treatment, resulting in a return to normal, or prevention of further progression; on the other hand there may be a hearing loss which is permanent, progressive, and not amenable to definitive medical therapy. In such a case, it is just as important to seek help to hear as it is to find a cure.

When Help Is Needed

If a hearing test shows a loss greater than 30 decibels in the speech frequencies, or if you are noticing difficulty with telephone conversations, or you are missing words here and there in groups such as parties, church, theaters or lectures, or even in your own home when separated by more than the size of one room or perhaps you need the radio or television turned up louder than anyone else, you definitely need help as soon as possible.

The person with a hearing loss can "conjure up" many more reasons for not seeking help. Some of these are vanity, nuisance, expense, no real difficulty in hearing, procrastination and hope that "perhaps it will get better." Believe me, ladies and gentlemen, all of these reasons put together are minute when compared to the benefits of good hearing even when obtained by artificial means.

We have discussed some of the reasons for not wearing a hearing aid very briefly; now, let us take a positive attitude and discuss the meaning of good hearing and some of its benefits.

Most Important Sense

I do not believe any straight thinking individual will disagree when I say, "Hearing is the most important special sense we have." Offhand you will probably say to yourself, "He doesn't know what he's talking about; vision is more important than hearing." This, of course, is a matter of opinion, but opinion is usually based on evidence, and if there is enough evidence opinions can be changed. As evidence I present the following:

It goes without saying that without hearing there is no speech and without speech there is restricted communication; and where would civilization be with restricted communication. I contend that a highly complex intellectual life such as ours would be impossible without hearing and that each of us must have as good hearing as possible if we are to maintain our place in this type of society.

(Continued in Next Issue)

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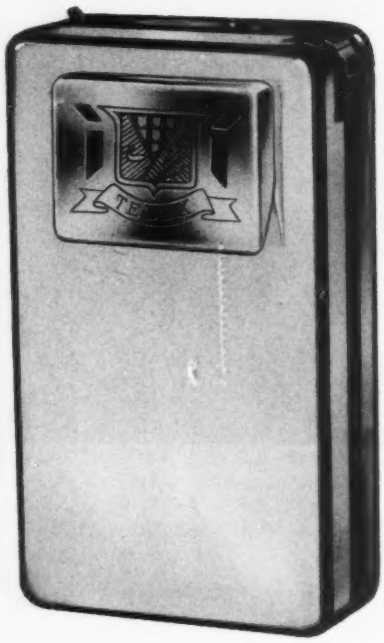
the economical hearing aid the hard-of-hearing will be proud to wear.

TELEX



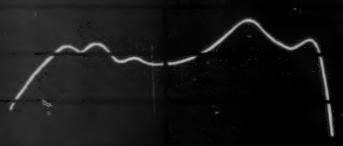
all-transistor 956 with magic mike®

Telex All-Transistor gives the finest vacuum tube quality performance with tremendous transistor savings. Its balanced tone pick-up is the ultimate in sound reception. New 3-position tone control helps transmit sound with unequalled fidelity and clarity. The Telex All-Transistor is also equipped with a newly-designed telephone pick-up.

This magnificently performing, handsomely styled instrument is $\frac{5}{8}$ inch thin, weighs only 3.7 ounces without batteries, and operates on just one miniature power-cell! (Those with *above* average hearing loss need only two miniature power-cells for completely satisfactory hearing.)

look at the sound curve established by **Telex all-transistor**

Typical response of Magic Mike 1000 OHM External resistive load



Graphic evidence of high fidelity sound reproduction — This sound curve shows how the Telex All-Transistor with Magic Mike captures and brings up lows, reduces highs. Now hearing aid users can appreciate all the rich beauty of natural sound!

Telex all-transistor 956 is designed for
finest fidelity, clarity, range—and designed to sell!

magic mike — All-new super-sensitive microphone—was developed specifically to utilize all the advantages offered in an all-transistor hearing aid. Placement under clip and a special noise-cancelling feature minimize clothing noise.

3-transistor transmitter — Sensitive, tiny transmitter with three transistor compensated circuit gives fine quality of vacuum tube performance with impressive transistor savings.

economically powered — One tiny power-cell flawlessly powers the Telex All-Transistor for only 1/10 of 1 cent per hour. Two miniature power-cells provide complete power for users with an above-average hearing loss.

telephone pick-up — Newly designed, eliminates outside noise interference, concentrates hearing on clear transmission of phone voices.

3-position tone control — Enables user to select sound quality preferred. Control is conveniently placed, trimly recessed inside the case to avoid catching on clothing. Stays dependably where it is set.

light and thin case — Handsomely styled, ⅝ inch thin . . . one of the thinnest cases ever designed. Complete instrument weighs only 3.7 ounces without batteries.

telethin receiver — Specially designed for use with Telex All-Transistor—25% thinner than ordinary receivers—thinnest receiver designed for completely dependable, always practical operation.

. . . and to enlarge the circle of Telex users . . .

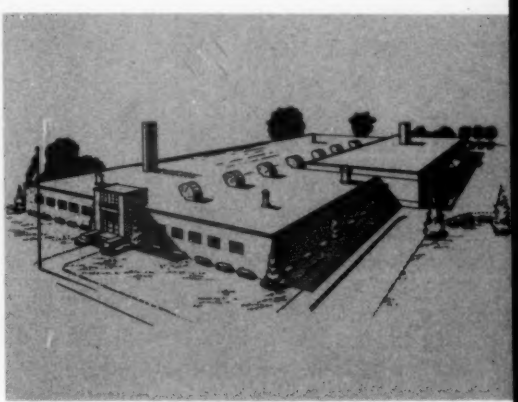
Telex has created the most complete merchandising and advertising campaign in its history! Each Telex distributor is assisted with advertisements in local newspapers, trade magazines, radio and television, display, national mailings, direct mail, window streamers, and complete publicity coverage—PLUS a complete variety of "sell" literature. Telex wants all its distributors to enjoy good profits—and above all, Telex wants as many people as possible to enjoy the wonderful world of sound.

Photo at right is part of the production line where the Telex All-Transistor is manufactured.

Why is the manufacturer of the world's finest precision hearing aids

Telex has a background of many years in the field of electronic miniaturization. In its first year, 1937, the Telex laboratories manufactured the first practical wearable vacuum tube hearing aid. Telex has maintained a fine reputation by expertly designing and manufacturing a wide variety of precision electronic instruments for government, industry and the hard-of-hearing.

Telex maintains a large, highly skilled staff of electronic engineers, designers, methods specialists and others. These experts consider every Telex engineering advance a challenge to make further improvements.



The Telex plant is one of the largest and best equipped in the industry. In this plant, with over 30,000 square feet of floor space and a suspended sound room, Telex utilizes the very latest in fine precision equipment, test instruments and tools.

The Telex All-Transistor with Magic Mike is the result of all these factors—the result of 16 successful years of practical manufacturing experience, research and intimate knowledge of the latest engineering techniques. No other hearing aid is so faultlessly designed, so carefully manufactured with such outstanding craftsmanship.

If you are not a Telex distributor and have tried almost everything to get more sales—read the good news for you:

Some franchised Telex territories are still open!

Take advantage of the big promotional campaign that is preparing the ground for a big Telex sales year. Write NOW to Howard Cullen, General Sales Manager, Hearing Aid Division, Telex, Inc., Telex Park, St. Paul, Minnesota.

TELEX, inc.

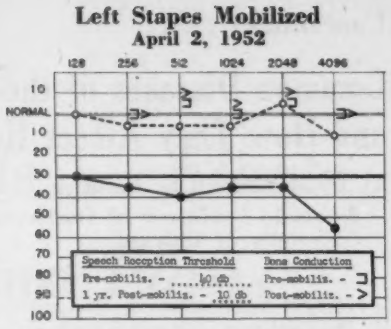
Manufacturers of the world's finest precision hearing instruments.

Minor Surgery for Otosclerosis and Meniere's Disease

by *Samuel Rosen, M.D.*

Associate Otologist, Mt. Sinai Hospital, New York

Dr. Rosen, a graduate of Syracuse University, a Diplomate of the American Board of Otolaryngology and prominent in the activities of the Academy of Medicine, American Otological Society, County Medical Society of New York and many others, was invited (1951/52) by the government of Israel to teach Israeli ear surgeons the new surgical techniques discussed by him in the paper here presented.



Case 1. E.L. The solid line indicates the air conduction audiogram taken just before mobilization of the stapes of the left ear. The dashed line shows the air conduction audiogram for the same ear taken one year after mobilization. The speech reception thresholds taken over the same period are also shown.

A. OTOSCLEROSIS

In a normal hearing apparatus sound is conducted through a freely movable ossicular chain (malleus, incus and stapes) to the cochlea. When the ossicular chain is not freely movable maximum sound cannot easily reach the cochlea and deafness results. In otosclerosis the stapes is not freely movable but is held rigid in the oval window by a pathological growth of bone. Sound destined to reach the cochlea is thus impeded and the typical deafness results. This lesion is by far the most common one causing deafness. The hearing aid is best suited for this type of deafness.

The exacting fenestration operation abandons and short circuits the incompetent, rigid stapes in the oval window and creates a new window (fenestra) through which sound more readily reaches the cochlea. A permanent improvement in hearing depends upon a perfectly performed operation in an ideally suited case of otosclerosis. Pure tone, speech and other audiometric tests give us the basic knowledge necessary to predict the results to be expected from the fenestration operation. Yet there are many cases in which all the audiological tests still leave in doubt the diagnosis of otosclerosis and therefore doubt as to the suitability for fenestration.

Patients with a fixed stapes seem to be the ones best suited for fenestration surgery. Audiological tests cannot always tell us with certainty the degree of immobility of the stapes. Any test, therefore, that could give us absolutely certain information as to the status of the stapes, would lead us to a more proper choice of case to be operated. Such a test, it seems, may now be at hand since it consists of simply lifting up the lower half of the eardrum which

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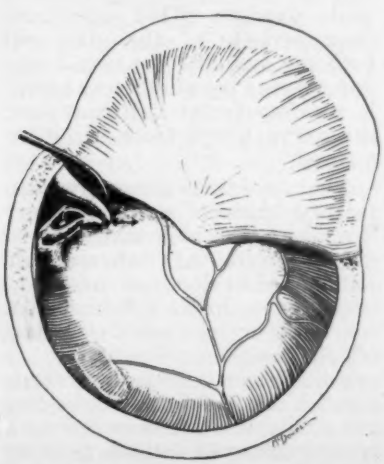

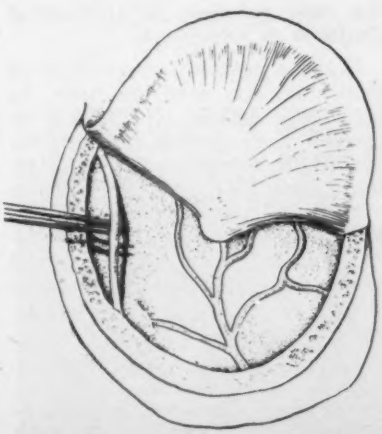

Fig. 1. Drum is reflected upward and the long process of the incus, head, neck, crura, and tendon of the stapes are seen. The palpating probe is placed against the long process of the incus close to the stapes. The slight up and down pressure against the incus is made in the direction of the upper arrow. When the stapes is only partially fixed the incus, head, neck, crura, and tendon of the stapes are all seen to move together. Slight pressure of the point of the probe on the head and neck of the stapes is exerted in the direction of the lower arrow. When the stapes is only partially fixed, the head and crura can be seen to move. In a completely fixed stapes, no movement whatever is seen of the head, neck, crura or tendon of the stapes.

Fig 2. After lifting the drum out of its sulcus, it is folded upward, thus exposing the chorda tympani nerve which is seen resting on the bipolar electrodes during electrical stimulation.

Fig. 3. Eardrum lifted out of its sulcus and reflected upward upon itself. The chorda tympani nerve can be seen in the grasp of the iris hook ready to be sectioned. The bony grooves of the tympanic plexus of nerves can be seen.

Concluding . . .

Common Diseases of the Hearing Apparatus and How They Affect Hearing Function

by Dr. Heinrich G. Kobrak
Associate Professor of Otolaryngology
University of Chicago

Normal hearing is possible only if the stirrup (stapes) moves freely in the oval window, producing oscillating movement of the fluid in the inner ear between the oval and the round windows. In the disease otosclerosis there is a characteristic change in the bone; a diagnosis can only be made if it reaches the elastic fibers, or ligaments, that attach the stapes to the oval window and thus interferes with the vibration of the stapes in the oval window.

No medicine or hormone can check otosclerosis, which occurs more frequently in women than in men. When these women are pregnant the disease develops faster and they suffer frequently a further hearing impairment. The change is sometimes so severe that some otologists advise against pregnancy in female patients who have otosclerosis. Though we don't know how to cure the disease we can treat the deafness with the famous fenestration operation.

To recapitulate: sound is normally conducted over the ossicular chain of the middle ear to the oval window; the vibrations of the window produce shuttle movements in the fluid of the inner ear which in turn produce the normal nerve stimulation in the inner ear. In otosclerosis, new bone formation produces a rigidity of the elastic ligament in the oval window that cannot be treated. Instead a new window is made in the semicircular canal, which belongs to the system for maintaining equilibrium. A hole is drilled through the bone and is covered up with thin skin folded back from the eardrum and outer ear canal. The operation restores hearing because the nerves are stimulated by the shuttle movements of the inner ear fluid which now take place between the new window and the round one.

Danger of ear damage from excessive noise begins at about 95 to 100 decibels. The levels of airplane noises, and of a 12-inch cannon, are higher than the danger level. There are many industrial situations in which people are exposed to loud noises and may, as a result, suffer hearing losses that may be permanent if exposure is not stopped in time.

Representative of nature's loud noises is the noise level of Niagara Falls, which is 95 decibels—just about the borderline. But the real danger comes from man-made noises such as those from industrial machinery, artillery, jet engines, et cetera. Early hearing losses due to industrial noise are generally characteristic. For instance, an early symptom is a dip in the hearing curve at a frequency around 4,000, or C-5 in musical terminology. This dip occurs whether the damaging noise does, or does not, contain this particular frequency. The damaged frequency area of the inner ear is therefore not necessarily identical with the damaging frequencies.

Experiments in exposing animals to loud sounds have shown that the nerve fibers in the inner ear are destroyed. Since destroyed fibers cannot be replaced, ***the only solution for industrial deafness is prevention.***

When a person is exposed to an explosion, the eardrum may, or may not, break. If the drum breaks, then sound reaches the oval and the round windows at the same time. The inner ear is then not excited as much and will not incur damage as easily as if the eardrum remains intact and sound goes predominantly through the oval window. This structural characteristic of the ear, with both the oval and the round windows facing the middle-ear cavity, is a safety factor that may keep the nerve fibers from being destroyed.

There are three generally satisfactory types of ear defenders* One, the small plug which is put directly in the ear; two, a doughnut-shaped device that covers the entire ear; three, a helmet that covers the entire head. Dry cotton, which is used most frequently, has practically no defense value whatever. A number of ear defenders are available that lower the noise level by 25 or 30 decibels to bring it down from the danger area. The sub-committee on noise abatement of the American Academy of Otolaryngology recommends custom or tailor-made molds.

*A list of Ear Defenders and their qualifications may be obtained from Dr. Howard House, 1136 W. 6th Street, Los Angeles, California.

Dave Barnow's Sales Philosophy

An "organization" might be said to be the reflection of the group—or the man—at the top. Strength, enthusiasm, confidence in the component members of that organization are not only reflected, but given concrete evidence by its achievements.

One of the leading members of our industry represents a true example of the idea expressed above . . . and with reason. In a recent letter to Grover C. Coil, the general sales manager of Belton, David H. Barnow, had the following to say about his sales organization:

". . . Our convention was truly outstandingly successful. You could actually feel the atmosphere charged with enthusiasm, friendship and loyalty. These I count as our greatest assets. But then, how else could it be, with the greatest bunch of guys a company ever did business with? And I mean that, too!"

There is a lesson for all of us in these words!

Classified

Hearing Aid Franchise Available

Profitable, well-established Hearing Aid Franchise available in Oklahoma City, Oklahoma. Approximately 1,000 qualified users. Minimum investment required. Total investment covers merchandise and stock only. Write Box T640, Audecibel, 6 N. Michigan Ave., Chicago 2.

FOR SALE: Old, established Midwest ethical dealership with old line franchise. Industrial community sustaining rural area. More than a decade of continuous profitable operation. Owner desires to retire a/c health. Write Box D701, Audecibel, 6 N. Michigan Ave., Chicago 2.

A.H.A.A. . . . Meets . . . Elects . . . Reports and Plans

Good Attendance

On February 9, 1954, a day-long meeting of the American Hearing Aid Association was held at the Hotel Lexington, New York City. About half the membership of the Association was present, including representatives of Beltone, Nation Carbon, Radioear, Raytheon, Audivox, Microtone, Sonotone, Ray-O-Vac, Acousticon, Maico, Paravox and Olin Industries. Also present were Drs. Merle Ansberry and Thomas Knox of the Veterans' Administration, Washington, D. C., and Dr. Lester L. Coleman, otologist and a medical consultant to AHAA.

Davis Reports

Of particular interest was the first formal report presented by the recently appointed public relations director of the Association, Leonard Davis, in which he summarized the activities of the first three months of this operation, indicating that a very live and many-faceted program had been initiated with some worthwhile results already evidenced.

The public relations program of the AHAA, Davis pointed out, has two broad objectives: to raise the standards of the industry, and to make more people conscious of the importance of good hearing, from the points of view of social, economic, health and safety advantages.

Other angles covered by the program include the relationships between the hearing aid industry and the medical profession. And dealing with the Veterans Administration and the FTC on behalf of the industry.

Annual Elections

In connection with the eight elective offices of the Association, four were re-elected: Lee Watson, Maico, president; Dave Barnow, Beltone, vice-president; Walter Settle, Ray-O-Vac and Fred Wonders, Paravox, directors. Newly elected were Bill Peters, Raytheon, vice-president; Andy Propper, Audivox, treasurer; and Ed Myers, Radioear, director.

Leonard Davis was officially "elected" Secretary of the Association, giving indication of the importance which is going to be placed on public relations activities by the group.

Plans

An eight-point program was outlined and presumably approved, subject to full membership acceptance, as a guide for future activities of AHAA. Briefly, some of these points will cover:

- Relations with the U. S. Veterans Administration.
- Handling of confidential member sales information and data.
- Licensing problems in transistor circuitry.
- Relationship of AHAA with A.M.A.
- A possible "Engineering Excellence Award."
- A possible exchange of technical and sales information, with the aim of helping to elevate standards and improve the service of the industry.
- The challenge of "socialism" in the hearing aid field.

See Editorial, Page 2!

SHAA takes issue, however, with one point in the AHAA program which it feels is in direct and contradictory conflict with the best interests of the hearing aid industry as a whole.

On the agenda of the AHAA meeting was the following: *"Consideration of an industry program of certification of hearing aid consultants in view of individual certification programs by individual companies and dealer organizations."*

While extending congratulations and a pledge of full cooperation to the AHAA on their public relations program, Thornton Zanolli, president of SHAA, in con-

(Continued on Page 16)

New officers of the AHAA elected at the February 1954 meeting in New York include (seated, left to right) Andrew Propper, Leland Watson and William Peters; (standing) Walter Settle, David Barnow, Fred Wonders and Ed Myers.

Dr. Belucci . . .

(*Continued from page* 4)

symptom being a stuffy ear with loss of hearing. Young children and infants do not complain of an ear only slightly uncomfortable and it may go unnoticed for a long period of time before the parents realize there is something wrong with the child's hearing. Exudates which remain in the middle ear are very irritating to the tissue and cause adhesions to develop. These adhesions bind the ossicles and conduction of sound is impaired. Perhaps months later the mother notices the child does not respond when called and seeks further notice—often it can be too late. Otolaryngologists are detecting these exudates more frequently today than ever before. Many theories are being advanced on how exudates develop. It is well known that eustachian tube obstruction causes fluid to be secreted into the middle ear and hearing is naturally impaired under these conditions. Prolonged blockage of the eustachian tube is therefore offered as one of the theories of the formation of middle ear exudates. Others believe that since the advent of antibiotics a middle ear infection which would usually become purulent and cause a severe abscess is modified by treatment, and only a serous exudate is allowed to form. The germs are reduced in virulence by the chemotherapy and the serous otitis which develops may lie dormant for many weeks and months. Finally the hearing loss which is a result of this exudate becomes permanent.

The most frequent cause of eustachian tube obstruction in children is diseased tonsils and adenoids. Obstruction of the outlet of the eustachian tube by large adenoids causes ear disease and loss of hearing. The eustachian tube may also be affected by prolonged and frequently repeated colds and attacks of sinusitis. This nasal infection is also driven into the eustachian tube by children who blow their nose forcible and incorrectly. Prolonged nasal infection and large adenoids cause a mild middle ear inflammation with retracted eardrums. A slight loss of hearing varying from 10-20 db may be present which is hard to detect. The child may not have had any ear pain, but an otologist can detect trouble in the middle ear and prescribe accordingly. If these conditions are allowed to proceed unchecked a permanent loss of hearing may result which cannot be resolved. Therefore, exudate in the middle ear due to eustachian tube obstruction can be a masked condition which needs expert attention. In all but a few cases a child can be cured and his hearing returned to normal.

Children with frequent colds and sore throat, with or without ear problems, but with large and diseased tonsils and adenoids should have them removed. A new concept among pediatricians has developed subscribing some function to the tonsils and adenoids and they do not recommend removal under any condition. Any organ which is diseased, whether appendix, gall bladder, kidney, etc., should be removed according to surgical principles. The pediatrician's management of the diseased tonsil and adenoid problem shoud not be a series of penicillin injections several times a year, year after year. No doubt he is observing the thermometer. but many problems of the ear and nose may be masked and may be ignored. A competent surgeon certainly never removes a healthy organ. Neither do otolaryngologists remove healthy tonsils and adenoids. However, on them should rest the responsibility in making the decision as they are the best judges.

(Continued in Next Issue)

Summer Meeting Announced

The Alexander Graham Bell Association for the Deaf (formerly The Volta Speech Association for the Deaf) will hold its 1954 meeting at the Chase Hotel in St. Louis June 14 to 18. Theme will be "Let's Face the Issues" and will cover many facets including where the deaf child should receive his education; Possibilities and limitations of auditory training; Principal issues in teaching speech; Understanding of deaf children by persons in peripheral fields.

A.H.A.A. Meets

(Continued from Page 15)

nection with the above proposal, pointed out in a letter to the Secretary of AHAA the following important considerations:

> "All who have been interested in the success of a certification program have agreed: to be successful, the program must be divorced from commercial bias or control. Programs of certification carried on by individual hearing aid manufacturers concerning their own product, have much to recommend them and will continue to receive SHAA acceptance.
>
> "Careful steps have been taken to avoid any taint of commercialism in the Certification program of the Society. SHAA members earnestly desire to keep it that way.
>
> "We earnestly desire your cooperation (with the industry's sole Certification program); not your competition. We do not, and have not, worked *against* any individual, group or company."

Mr. Zanolli urged the AHAA to throw its support, advice and help behind the Society's program of encouraging and recognizing, through official Certification, ability, knowledge and higher ethics in the fitting, servicing and selling of hearing aids meriting such acceptance by the Society's members.

Perhaps the conflict represented here is merely one of economics. Perhaps, for "certification" of dealers is meant recognition and constructive support by AHAA members of the Society's Certification program.

A Calendar of Events will be a regular feature of Audecibel, starting with our next issue. Let us know about your sales meetings, conventions, symposiums, special school sessions, etc. Be sure to give us the nature of your meeting, its theme, date and place, etc.

Is your 1954 Membership Fee paid? Note: March 15, 1954, **deadline** for the **1954 Annual Directory** of **Certified Hearing Aid Audiologists**

The most dependable RADIOEAR

The advent, early in 1953, of commercial quantities of alloy-junction type transistors caused the most red faces in the hearing aid industry and the choicest collection of alibis we have seen for many years.

Radioear engineers had, for twenty-nine years, basically engineered, designed and built Radioear hearing aids, earning in that period an unsurpassed reputation for advanced design and highest quality manufacture. Radioear engineers started transistor research from scratch with the first experimental point-contact type transistor which became available in 1948.

Radioear engineers had developed, in 1946, the first practical, successful small magnetic microphone for hearing aid use and it has been manufactured in quantities and incorporated in successful Radioear models ever since. That was a seven year lead for Radioear because even those who publicly attacked the use of transistors have adopted other magnetic microphones and strangely enough they now advertise that "transistors are practical."

Radioear had no occasion to offer excuses or alibis in 1953. The remarkable success of the All-Transistor Radioear of 1953 speaks eloquently for itself. It is no wonder that Radioear Distributors have enjoyed the most successful year in their hearing aid history.

Radioear has also developed a much cherished reputation for truthful advertising. To state the case for transistors as simply, as significantly and as truthfully as we can, the All-Transistor, All-Magnetic Radioear 820 is the most dependable Radioear ever produced.

RADIOEAR CORPORATION

PITTSBURGH 16, PENNSYLVANIA

Trustworthy Hearing Aids Since 1924

Dr. Theobald . . .

(Continued from Page 6)

causes the dizziness and with each attack of dizziness, further hearing loss occurs. Following the attack of dizziness, which is quite severe, the hearing recovers to a degree but never goes back to the original level of before the attack. Since the hearing is a little worse after each attack, there eventually is a total loss. This type of hearing loss is usually unilateral.

Another cause of perception deafness is brain tumors, the most common being known as an acoustic neuroma, which destroys the auditory nerve and prevents sounds from being transmitted to the brain, even though the middle ear and internal ear may be normal. Deafness from a brain tumor is invariably unilateral.

A third type of internal ear deafness has toxic causes, which may have many definitions. There is the specific toxicity of severe infection. For example, an individual may lose his hearing completely, or almost so, after an attack of mumps. Such an inner-ear hearing loss indicates a toxic deafness, or a deafness due to the toxins that were in his system at the time he had his illness. Other illnesses than mumps may also cause deafness.

Another common cause of hearing loss is that resulting from the taking of large doses of aspirin. Quinine is a very common cause of deafness. One of the newer drugs, streptomycin, may cause partial or total deafness. In fact, when streptomycin was first used, large doses were indicated and many people lost their hearing. As a result, dosage of this drug has been greatly reduced.

The last great group in inner-ear deafness are what must be classified as unknown causes. An individual may have a nerve deafness for which no reason can be found. This group includes, of course, advancing age because it is a well known fact that the auditory nerve is peculiarly susceptible to deterioration.

Treatment of illness and conditions of the external ear is relatively simple. A large collection of wax or a foreign body may be removed. An infection causing swelling of the skin is relatively simple to clear up.

Infection of the middle ear should be treated conservatively if possible. If it can be cleared up, hearing will usually return to normal or almost normal. Such infections, however, may require mastoid surgery, in which techniques are constantly being improved, so that following such an operation, hearing may return to normal or nearly normal.

In cases of otosclerosis, and only in otosclerosis, the fenestration operation may be used. Furthermore, the operation can only be done on patients whose internal ear function is normal, as determined by audiometric and tuning fork testing. This operation is designed to short circuit the inability of the stapes to vibrate in the oval window. A new window is made where the horizontal semi-circular canal is located, so sound may travel by this new route. The rest of the ossicles, excepting the stapes, are removed and the ear drum and skin of the canal are used to cover the opening.

The success of the fenestration operation results from the fact that the fluid around the delicate mechanism of the organ of hearing and that around the semi-circular canals is one and the same. Whether a vibration gets through this route or that route, it will set up vibratory motion in that fluid and hearing will result. Of course, that hearing is never entirely normal but the patient can get along in his normal daily activities—he will have practical hearing for social and economic purposes.

Treatment of Meniere's disease of the internal ear consists of an attempt to control the patient's salt and fluid intake in order to keep down the pressure that builds up in the internal ear. Most cases of Meniere's disease are controlled in this way. In other cases, drugs such as Dramamine, which is used to control seasickness, may be used, or surgery may be resorted to. In extreme cases it is necessary to remove the semi-circular canal to eliminate the attacks of dizziness.

Where a tumor is pressing on the auditory nerve and removal of the tumor is necessary, the portion of the nerve that was part of the tumor is also removed, resulting in total deafness. Without removal, however, the tumor would eventually prove fatal.

It will be found that most persons who have a nerve deafness due to unknown toxic causes have already been through quite a severe routine. Most have had nasal and/or tonsil surgery. Most have had X-ray or radiation therapy of some sort. Most have had diathery, and most have had various drugs given in an effort to improve their hearing. None of these things is successful in nerve deafness.

A few of the drugs that have been tried unsuccessfully—some of which, unfortunately, are still being used—to help victims of nerve deafness include prostigmine, lipoiodine, histamine treatments, Jacobson's solution, and Anatola which came out a few years ago and is merely Vitamin A with a fancy name.

This last group of people is the one that otologists and hearing aid audiologists can cooperate to help most substantially. First, by accurate diagnosis; then by the proper fitting and adjusting of a suitable hearing aid.

Moved lately? . . . or otherwise changed your address? Please advise us at once, sending both old and new addresses, so you will be accurately listed in and sure to receive your **1954 Official Directory**

Certification Applicants! Will YOU be listed in the **1954 Official Directory** of CERTIFIED HEARING AID AUDIOLOGISTS? Make haste to send in your answers to the Certification Quiz AT ONCE. Be certain of inclusion in this year-round reference book . . . available to 7,000 ear physicians and their patients, rehabilitation agencies and the entire field of educators, clinics and social service workers in the field of audiology.

DIRECTORY LISTINGS

"Applications Pending"

New applicants and those applicants pending final action by the National Board will be listed under this heading.

"Certification Withdrawn"

Under this heading will be listed those who have been dropped from membership for non-payment of renewal fees or other reasons.

Look To
BELTONE
For Leadership In Hearing Loss Correction

FIRST IN SERVICE TO THE HARD OF HEARING

DURING the past year, Beltone leadership in the hearing aid field was tremendously strengthened by the introduction of the remarkable new Beltone Concerto Model.

Hailed as the "clearest voice in hearing aid history" its revolutionary triple transistor circuit sets new, higher than ever standards of clarity and ease of hearing—of compactness, convenience, and to an unprecedented degree—of operating economy. One tiny cell gives up to 500 hours of crystal clear hearing at a cost of only 30c.

To buy one of these instruments is, moreover, to get far more than the last word in hearing aid quality and electronic efficiency. Each one is scientifically fitted by a qualified consultant using Beltone's own electronic methods to insure maximum availability of the instrument's inherent capacity.

There are 272 different fittings of power, gain and response. Maintenance of initial efficiency is assured, moreover, by a highly organized service program unexcelled in the hearing aid industry.

Whenever a hearing aid is indicated, therefore, to recommend Beltone is to insure maximum hearing satisfaction even for the very hard of hearing. Write today for complete information or see the Beltone distributor listed in your telephone directory.

Beltone

TRIPLE-TRANSITOR HEARING AIDS

Individually Fitted—Personally Serviced

BELTONE HEARING AID COMPANY, 2900 West 36th Street, CHICAGO 32, ILLINOIS

Dr. Rosen . . .

(Continued from Page 13)

exposes the stapes to view and manipulation. By means of a probe, with light pressure against the stapes, one can actually see and feel the stapes move or not move.

METHOD

Palpation of the stapes to test it for mobility is performed through an ordinary ear speculum under local anaesthesia. The lower half of the intact eardrum is lifted out of its bed, folded upward upon itself like an apron. This brings to view the stapes and incus. As the stapes is being palpated with the end of a fine probe, its mobility or immobility can be seen and felt. **(Figure 1.)** In this manner we obtain absolutely certain knowledge of the condition of the stapes, thus allowing with greater certainty the decision to proceed with fenestration or to avoid a fruitless fenestration operation. The patient is ambulatory immediately after the operation, on a full diet, and leaves the hospital within 24 hours. There is no dizziness and no after-care.

This method was employed in the following case: E. L., a married man 43 years old, had bilateral progressive deafness, much more marked in his left ear. His mother and maternal grandmother have been deaf for a great many years. He had highpitched tinnitus at times. He had been observed by outstanding otologists in various parts of the country, all of whom strongly suspected otosclerosis as the cause of his deafness and leaned toward fenestration as the method of treatment. He was referred to me for fenestration. The decision reached by the patient and myself was to lift up the left eardrum to test for stapes fixation. On April 3, 1952, this procedure was done. On palpation the stapes was partially fixed but when palpated could be seen to move. Suddenly during the to-and-fro movement of the stapes the patient said, "I can hear everything now—things I haven't heard for so many years." **(Audiogram showing pre and post operative audiological findings. Page 13.)**

This phenomenon was identical with the sudden return of the hearing of patients while on the operating table at the completion of the artificial fenestra in cases of otosclerosis. The hearing improvement in this case has persisted and increased to date. Possibly the partially fixed footplate of the stapes was loosened and made more movable, resulting in this remarkable improvement in hearing. Slight increase in the mobility of the footplate could result in marked improvement in hearing, since all the conditions of normal hearing which nature has provided are in this procedure restored — a movable footplate in nature's own oval window and an intact ossicular chain. This condition, it seems, would have advantages over the complex physical, mechanical and physiological changes introduced by the fenestration operation, i.e., an artificial window, a change in acoustics, and an interruption of the ossicular chain function.

(Continued in Next Issue)

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APOLOGIA

Through a grievous oversight, in our last issue (Page 9) the paper specially prepared for Audecibel by the illustrious **Dr. Barry J. Anson** was erroneously given the "by-line": Harry J. Anson. To paraphrase—a man's name is his castle, especially in the professions. However, Dr. Anson's position is of such world-wide renown in the anatomical field, that we are certain none questioned for a moment "What Dr. Anson?" There is only one.

• In the list of Exhibitors (Page 8) to whom we paid tribute for their deep cooperative interest by participation in all the constructive activities of SHAA, the name of one of the leading firms in this category was unfortunately omitted. We herewith pay tribute to them personally and list, as one of the best friends of the certified hearing aid audiologist, a firm that has cooperated as exhibitor, as advertiser, as a source of informed panel members, and with many contributions to the field:

THE MAICO COMPANY, INC.
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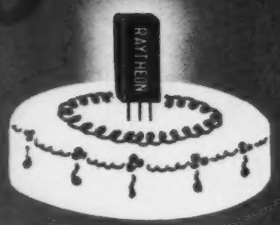

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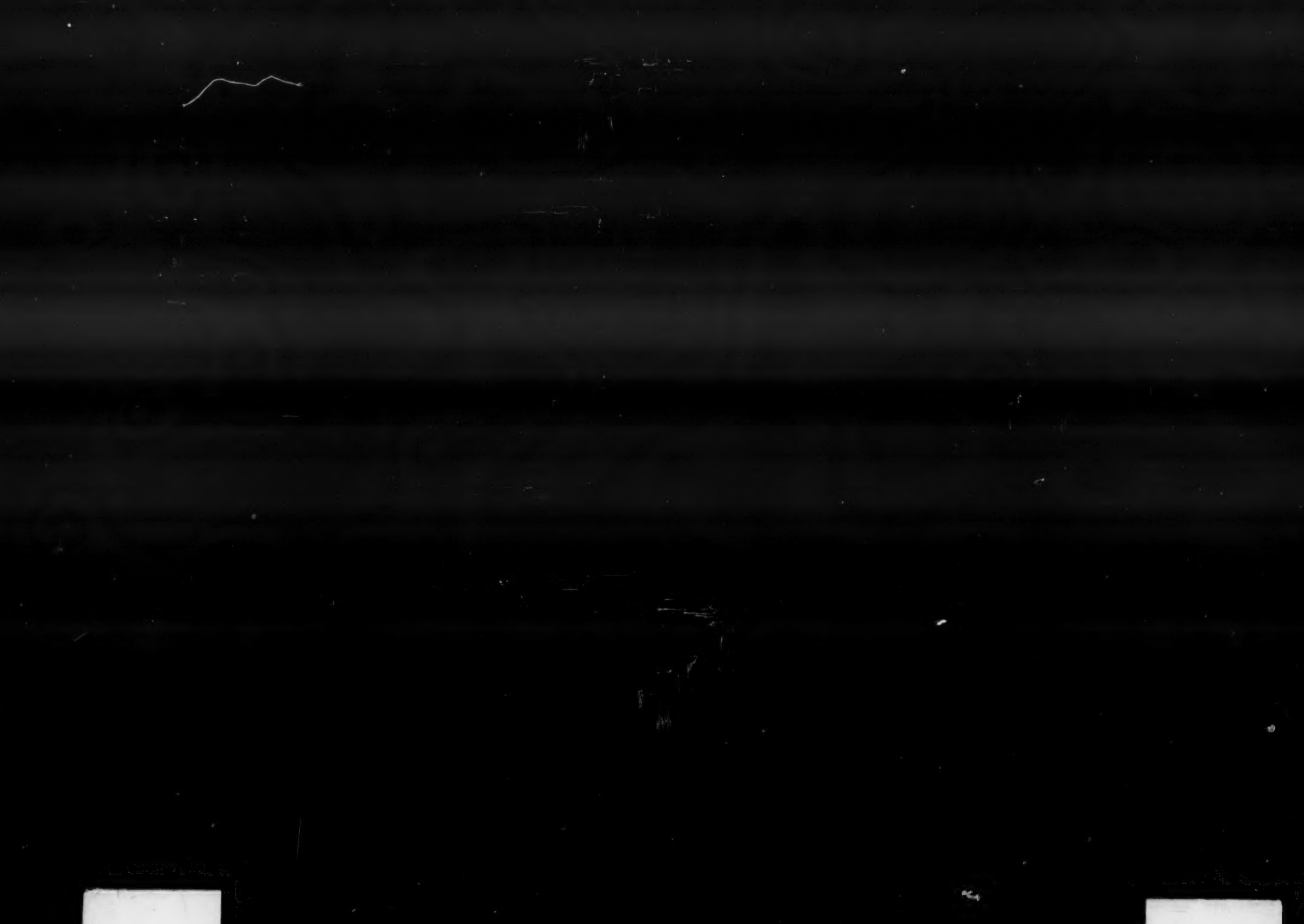
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